

## REMARKS

### I. Introduction

In response to the Office Action dated June 22, 2005, claims 1, 8, 11, 18, 21 and 28 have been amended. Claims 1-30 remain in the application. Entry of these amendments, and re-consideration of the application, as amended, is requested.

### II. Claim Amendments

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for patentability or to distinguish the claims over the prior art.

### III. Information Disclosure Statement

Applicants' attorney submitted an Information Disclosure Statement (IDS) on October 16, 2001. However, Applicants' attorney never received an initialed Form PTO-1449.

Applicants' attorney re-submitted the IDS with the response to the previous Office Action mailed on April 5, 2005. However, Applicants' attorney did not receive an initialed Form PTO-1449 with the final Office Action dated June 22, 2005.

Record is made of a telephonic interview that occurred on August 22, 2005 between Examiner Coffy and Applicants' attorney. Applicants' attorney informed Examiner Coffy that he had not received an initialed Form PTO-1449 for the IDS, and noted that the IDS had been re-submitted with the response to the previous Office Action mailed on April 5, 2005. Examiner Coffy requested that Applicants' attorney again note these facts in the response to the final Office Action, and that an initialed Form PTO-1449 would be provided.

Applicants' attorney requests that the Examiner initial the Form PTO-1449 and return it to Applicants' attorney.

### IV. Prior Art Rejections

#### A. The Office Action Rejections

In paragraphs (4)-(5) of the Office Action, claims 1-2, 4-9, 11-12, 14-19, 21-22, and 24-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sen et al., U.S. Patent No. 6,691,312 (Sen) in view of Aharoni et al., U.S. Patent No. 6,014,694 (Aharoni). In paragraph (6) of the Office Action, claims 3, 13, and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable

over Sen in view of Hazra, U.S. Patent No. 6,510,553 (Hazra). In paragraph (7) of the Office Action, claims 10, 20, and 30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sen in view of Tremblay et al., U.S. Patent No. 6,343,348 (Tremblay).

Applicants' attorney respectfully traverses the rejections in light of the amendments above and the arguments below.

B. The Sen Reference

Sen describes a method of multicasting video to multiple client nodes via intermediate nodes that includes accessing video information descriptive of the video to be multicast, accessing information describing a distribution tree of nodes from a source of the video to the multiple clients nodes via one or more internetwork nodes, accessing rate constraints of nodes in the distribution tree, accessing buffer allocations of the nodes in the distribution tree, and determining one or more smoothed transmission schedules for each node in the distribution tree based on the accessed video information, the accessed information describing the distribution tree, the accessed rate constraints of nodes in the distribution tree, and the accessed buffer allocations of the nodes in the distribution tree, the one or more transmission schedules describing the transmission of video data to one or more children nodes.

C. The Aharoni Reference

Aharoni describes a system for adaptively transporting video over networks wherein the available bandwidth varies with time. The system comprises a video/audio code that functions to compress, code, decode and decompress video streams that are transmitted over networks having available bandwidths that vary with time and location. Depending on the channel bandwidth, the system adjusts the compression ratio to accommodate a plurality of bandwidths ranging from 20 Kbps for POTS to several Mbps for switched LAN and ATM environments. Bandwidth adjustability is provided by offering a trade off between video resolution, frame rate and individual frame quality. The system generates a video data stream comprised of Key, P and B frames from a raw source of video. Each frame type is further comprised of multiple levels of data representing varying degrees of quality. In addition, several video server platforms can be utilized in tandem to transmit video/audio information with each video server platform transmitting information for a single compression/resolution level.

D. The Hazra Reference

Hazra describes reception of digital multimedia data signals from multiple sources in a stream over a fixed bandwidth communications path may be accomplished by subscribing to a base layer of a first source and a base layer of a second source, and subscribing to an enhancement layer of the first source. Data signals corresponding to the subscribed layers of the first and second sources may be received in a stream over the fixed bandwidth communications path, output signals may be produced which correspond to the received data signals for the first source, and output signals may be produced corresponding to the received data signals for the second source. The output signals for the first source may be displayed in a first portion or window of a display, and output signals for the second source may be simultaneously displayed in a second portion or window of the display, thereby providing a picture-in-picture (PIP) display for streaming digital video.

E. The Tremblay Reference

Tremblay describes a multi-ported register file is typically metal limited to the area consumed by the circuit proportional with the square of the number of ports. A processor having a register file structure divided into a plurality of separate and independent register files forms a layout structure with an improved layout efficiency. The read ports of the total register file structure are allocated among the separate and individual register files. Each of the separate and individual register files has write ports that correspond to the total number of write ports in the total register file structure. Writes are fully broadcast so that all of the separate and individual register files are coherent.

F. The Applicants' Invention is Patentable Over the References

The Applicants' invention, as recited in independent claims 1, 8, 11, 18, 21 and 28, is patentable over the references because the claims recite limitations not shown by the references.

Nonetheless, the Office Action asserts that the limitations "displaying selected frames from said frame source, on said display means, at their due time in order to maintain timing integrity of the clip," and "skipping frames in said frame sequence in response to an indication of the data transfer rate of said network" of claims 1, 11 and 21, and the limitations "selecting a next frame for preloading by skipping at least one frame in the clip's frame sequence," "preloading a frame from said frame source into a frame queue in said memory means," "displaying a preloaded frame at its due time in order to maintain timing integrity of the clip," "processing elapsed real time since the

clip started playing with a frame timing parameter,” and “updating the number of frames to skip in response to said processing of elapsed real time,” of claims 8, 18 and 28, can be found in the Aharoni reference.

Specifically, the Office Action asserts that these limitations are described in Aharoni at col. 4, lines 35-58, col. 6, lines 35-39 and 46-50, col. 8, lines 24-41, and col. 12, lines 47-51. These portions of Aharoni are set forth below:

Aharoni: Col. 4, lines 35-58

There is also provided in accordance with the present invention a method of transporting video from a video server to a video client over a network channel, comprising the steps of compressing data from a raw video source so as to generate a plurality of frames, each frame being of a particular frame type, each frame type containing a particular amount of video content information, each frame comprising a plurality of levels, each level corresponding to a particular degree of compression, estimating the bandwidth of the network channel, determining the amount of video information waiting to be displayed at the video client, selecting one of the plurality of levels of each frame to send over the network channel in accordance with the bandwidth estimate whereby the level selected optimizes the use of the bandwidth of the network channel, choosing which frames having a particular frame type to send over the network channel in accordance with the amount of video information waiting to be displayed at the video client, sending the chosen frames of a type containing a higher amount of video data content and of a selected level over the network channel utilizing a reliable communication protocol, and sending the chosen frames of a type containing a lower amount video data content and of a selected level over the network channel utilizing an unreliable communication protocol.

Aharoni: Col. 6, lines 35-39 and 46-50 (actually, lines 35-60)

The present invention is a system for adaptively transporting video and audio over networks wherein the available bandwidth varies with time. The invention has application to any type of network including those that utilize the Internet Protocol (IP) such as the Internet or any other TCP/IP based network. A high level block diagram illustrating the adaptive video transport system of the present invention is shown in FIG. 1. The system, generally referenced 10, comprises a video compression/file generator 14, video server 18 and one or more video clients 22. Only one video client is shown for clarity sake.

The video compression/file generator 14 in combination with the video client 22 comprise a video/audio codec or coder/decoder that functions to compress, code, decode and decompress video streams that are transmitted over the network 20 into a compressed video and audio file. The compressed file may be in any suitable format such as Audio Video Interleaved (AVI) format. Note that the network may comprise any type of network, TCP/IP or otherwise including the Internet. The generation of the compressed video and audio file 16 can be performed either online or off-line. Typically, the video and audio file is generated off-line. Note that, any suitable method of video compression can be utilized in the

present invention such as described in connection with the Motion Pictures Expert Group (MPEG)-1, MPEG-2 or MPEG-4 standards.

Aharoni: Col. 8, lines 24-41

A high level block diagram illustrating the video client portion of the present invention in more detail is shown in FIG. 3. The video client 22 comprises a packet receiver 50, packet decoder 52, a display generator 54 and a transmitter 51. The packet receiver functions to receive video packets as they come in from the network connection. The video stream data is removed and input to the packet decoder 52. The packet decoder functions to decode and decompress the video data stream and sends the decoded/decompressed video stream to the display generator 54. The display generator functions to prepare the video data for actual transmission to and display on the host computer's display subsystem. In addition, the packet decoder functions to generate acknowledges in response to the reception of packets from the video server. The acknowledges, in addition to other status information, are sent back to the video server via the transmitter 51.

Aharoni: Col. 12, lines 47-51 (actually, lines 42-55)

The packet generator 102 functions to receive the frames having video data from a particular compression level and encapsulate them into packets for transmission over the network. The assembled packets are output to the packet transmitter 104 which is responsible for delivery of the packets over the network. In addition, to preparing packets from the frames received, the packet generator functions to determine which (if any) frames to skip. Depending on the measured bandwidth of the channel, the packet generator may skip frames in order to reduce the transmitted bit rate. This occurs when the bandwidth of the network connection cannot support transmission of every Key, P and B frame. The method of choosing which frames to select is described in more detail hereinbelow.

Applicants' attorney respectfully submits that the above portions of Aharoni do not teach or suggest the identified limitations of independent claims 1, 8, 11, 18, 21 and 28, as amended.

The above portions of Aharoni merely describe adaptively transporting video and audio over networks from a video server to a video client using compression, wherein the available bandwidth varies with time. In Aharoni, a packet generator functions to determine which (if any) frames to skip, where the packet generator may skip frames in order to reduce the transmitted bit rate, depending on the measured bandwidth of the channel. According to Aharoni, this occurs when the bandwidth of the network connection cannot support transmission of every Key, P and B frame.

However, Aharoni does not recognize the need for skipping frames in order to display frames at their correct time based on the frame rate in order to maintain timing integrity of the clip. In the Applicants' invention, frames are always displayed at their correct time, based on their frame rate, and this is achieved by skipping frames when necessary. Thus, in Applicants' invention, a clip

having a duration of one minute will always complete its playback in one minute, regardless of the available bandwidth of the network. Thus, the display of frames from the clip takes place with the frames' relative timing preserved. In the event of a loss of network bandwidth availability, the only result will be a degradation in smoothness of the clip, because frames are skipped, but there is no modification of the rate at which the recorded events unfold.

Consequently, Aharoni does not teach or suggest the amended limitations of claims 1, 11 and 21 directed to displaying selected frames from said frame source, on said display means, at their correct time based on the frame rate in order to maintain timing integrity of the clip by skipping frames in said frame sequence in response to an indication of the data transfer rate of said network.

In addition, Aharoni does not teach or suggest the amended limitations of claims 8, 18 and 28 directed to selecting a next frame for preloading by skipping at least one frame in the clip's frame sequence, preloading a frame from said frame source into a frame queue in said memory means, displaying a preloaded frame at its correct time based on the frame rate in order to maintain timing integrity of the clip, processing elapsed real time since the clip started playing with a frame timing parameter, and updating the number of frames to skip in response to said processing of elapsed real time.

As a result, when combined, the cited references do not teach or suggest all the elements of Applicants' claimed invention. Instead, Sen merely describes a method of multicasting video to multiple client nodes via intermediate nodes that includes smoothed transmission schedules, while Aharoni merely describes adaptively transporting video over networks where the available bandwidth varies with time, Hazra merely describes providing a picture-in-picture (PIP) display for streaming digital video, and Tremblay merely describes a multi-ported register file.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Sen, Aharoni, Hazra and Tremblay. In addition, Applicants' invention solves problems not recognized by Sen, Aharoni, Hazra and Tremblay.

Thus, Applicants' attorney submit that independent claims 1, 8, 11, 18, 21 and 28 are allowable over Sen, Aharoni, Hazra and Tremblay. Further, dependent claims 2-7, 9-10, 12-17, 19-20, 22-27, 29 and 30 are submitted to be allowable over Sen, Aharoni, Hazra and Tremblay in the same manner, because they are dependent on independent claims 1, 8, 11, 18, 21 and 28, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-7, 9-10, 12-17, 19-20, 22-27, 29 and 30 recite additional novel elements not shown by Sen, Aharoni, Hazra and Tremblay.

V. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited.

Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

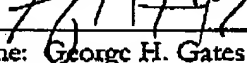
Respectfully submitted,

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